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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/720,342	11/25/2003	Seok Woo Lee	8733.949.00-US	3913

7590 01/11/2005
Eric J. Nuss
MCKENNA LONG & ALDRIDGE LLP
1900 K Street, N.W.
Washington, DC 20006

EXAMINER

TRAN, THUY V

ART UNIT	PAPER NUMBER
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2821

DATE MAILED: 01/11/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/720,342

Applicant(s)

LEE ET AL.

Examiner

Thuy V. Tran

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 03 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. §.133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 November 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11/25/2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

This is a response to the Applicants' filing on 11/25/2003. In virtue of this filing, claims 1-18 are currently presented in the instant application.

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Inventorship

2. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Drawings

3. The drawings submitted on 11/25/2003 are accepted.

Abstract Objection

4. The abstract of the disclosure is objected to because of the following informalities:

Line 4, ":" and "," should be deleted.

Correction is required. See MPEP § 608.01(b).

Claim Objections/ Minor Informalities

5. Claims 2, 4-8, 10-11, and 13-17 are objected to because of the following informalities:

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Claim 2, line 3, "in" should be changed to --from--;

Claim 4, line 3, --each of-- should be inserted between "of" and "odd-numbered";

Claim 4, line 5, --each of-- should be inserted between "of" and "odd-numbered"; and
"the" should be changed to --a--;

Claim 5, line 2, "the" (first occurrence) should be deleted;

Claim 6, line 2, "the" (first and second occurrences) should be changed to --a--;

Claim 6, line 3, "the" (first occurrence) should be deleted; and "the" (third occurrence)
should be deleted;

Claim 6, line 5, "the" (first occurrence) should be deleted;

Claim 6, line 6, "the" (third occurrence) should be deleted;

Claim 7, line 2, "the" (second occurrence) should be changed to --a--;

Claim 8, line 3, "the" (first occurrence) should be changed to --a--;

Claim 8, line 5, "the" (first occurrence) should be changed to --a--; and "a" (third
occurrence) should be changed to --the--;

Claim 8, line 8, "means" should be changed to --block-- (for terminology consistency);

Claim 10, line 4, "a plurality of" (second occurrence) should be deleted;

Claim 10, line 5, "the" (second occurrence) should be deleted;

Claim 11, line 3, "in" should be changed to --from--;

Claim 13, line 3, --each of the-- should be inserted between "of" and "odd-numbered";

Claim 13, line 5, --each of the-- should be inserted after "of"; and "the" should be
changed to --a--;

Claim 14, line 2, "the" (first occurrence) should be deleted;

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Claim 15, line 2, "the" (first and second occurrences) should be changed to --a--;

Claim 16, line 2, "the" (second occurrence) should be changed to --a--;

Claim 17, line 3, "the" (first occurrence) should be changed to --a--;

Claim 17, line 5, "the" (first occurrence) should be changed to --a--; and "a" (third occurrence) should be changed to --the--; and

Claim 17, line 8, "means" should be changed to --block-- (for terminology consistency).

Appropriate correction is required.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

7. Claims 1, 4, 10, and 13 are rejected under 35 U.S.C. 102(e) as being anticipated by Tajika et al. (U.S. Patent No. 6,469,453).

With respect to claim 1, Tajika et al. discloses, in Figs. 1, 3, and 4A-C, a lamp driving apparatus of a liquid crystal display comprising (1) a plurality of lamps [..., 3a, 3b, ...] (see Figs. 1 and 4A-C), and (2) an inverter block [..., 2a, 2b] (see Fig. 1) having a plurality of inverters [2a, 2b] that supply a drive current to the lamps wherein adjacent lamps have a different phase from one another (see Figs. 4A-C; Abstract, lines 6-7; col. 4, lines 21-25).

With respect to claim 4, Figs. 1, 3, and 4A-C of Tjika et al. appear to show that the lamp driving apparatus further comprises (1) a first common line commonly connected to a second electrode terminal of each of odd-numbered lamps of the plurality of lamps, (2) a second common line commonly connected to a second electrode terminal of each of even-numbered lamps of the plurality of lamps, and (3) a ground voltage line connecting each of the first common line and the second common line to a ground voltage source.

With respect to claim 10, Tajika et al. discloses, in Figs. 1, 3, and 4A-C, a lamp driving apparatus of a liquid crystal display comprising (1) a plurality of lamps [..., 3a, 3b, ...] (see Figs. 1 and 4A-C) including a plurality of odd-numbered lamps and a plurality of even-numbered lamps (since the number of lamps is N and N is greater than or equal to 2; see col. 4, lines 18-21), and (2) an inverter block [..., 2a, 2b,...] (see Figs. 1 and 4A-C) having a plurality of inverters [1a, 1b, 2a, 2b, ...] (since one pulse, whether A or B, is provided from one inverter; see Figs. 4A-C; see col. 3, lines 18-28) wherein the plurality of inverters that supply a drive current to the even-numbered lamps (since the number of lamps is N and N is greater than or equal to 2; see col. 4, lines 18-21) have a first phase and the inverters that supply a drive current to the odd-numbered lamps (since the number of lamps is N and N is greater than or equal to 2; see col. 4, lines 18-21) have a phase opposite the first phase (see Figs. 4A-C; Abstract, lines 6-7; col. 4, lines 21-25).

With respect to claim 13, Figs. 1, 3, and 4A-C of Tjika et al. appear to show that the lamp driving apparatus further comprises (1) a first common line commonly connected to a second electrode terminal of each of the odd-numbered lamps of the plurality of lamps, (2) a second common line commonly connected to a second electrode terminal of each of the even-numbered

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lamps of the plurality of lamps, and (3) a ground voltage line connecting each of the first common line and the second common line to a ground voltage source.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 1-7 and 10-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicants' Admitted Prior Art (AAPA) Figs. 1-4 in view of Tajika et al. (U.S. Patent No. 6,469,453).

With respect to claim 1, AAPA Figs. 1-4 show a lamp driving apparatus of a liquid crystal display comprising a plurality of lamps and an inverter block [20] having a plurality of inverters that supply a drive current to the lamps. However, AAPA Figs. 1-4 do not show that adjacent lamps have a different phase from one another.

Tajika et al. discloses, in Figs. 1, 3, and 4A-C, a lamp driving apparatus of a liquid crystal display comprising a plurality of inverters [..., 2a, 2b, ...] and a plurality of lamps [..., 3a, 3b, ...] in which adjacent lamps (for instance, 3a and 3b; see Fig. 1) have a phase different from one another (see Figs. 4A-C; Abstract, lines 6-7; col. 4, lines 21-25).

It would have been obvious to one of ordinary skill in the art at the time of the invention to implement the lamp driving apparatus of AAPA Figs. 1-4 by providing adjacent lamps a phase different from one another as taught by Tajika et al. to enhance the display monitor brightness

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since Tajika et al. teaches that the dynamic range of the display monitor brightness can not be sufficiently wide with lamps operated in the same phase (see col. 1, lines 32-37).

With respect to claim 2, AAPA Figs. 1-4 show that the lamp driving apparatus further comprises a current detector that detects the lamp drive current supplied to each of the plurality of lamps from the inverter.

With respect to claim 3, the combination of AAPA Figs. 1-4 and Tajika et al. (Figs. 1, 3, and 4A-C) disclose all of the claimed subject matter, as expressly recited in claims 1 and 2, except that the inverter block and the current detector are mounted in the same integrated circuit substrate and that the integrated substrate is folded to a rear surface of the liquid crystal display. However, this difference is not of patentable merit since it cannot be seen that such configuration may affect the functional operation of the driving apparatus. Therefore, accommodating the apparatus of the combination of AAPA Figs. 1-4 and Tajika et al. in such a way in that the inverter block and the current detector are arranged in the same integrated circuit substrate and the integrated circuit substrate is folded to a rear surface of the liquid crystal display would have been deemed as an obvious development to a person skilled in the art.

With respect to claim 4, the combination of AAPA (Figs. 1-4) and Tajika et al. (Figs. 1, 3, and 4A-C) appear to disclose that the lamp driving apparatus further comprises (1) a first common line commonly connected to a second electrode terminal of each of odd-numbered lamps of the plurality of lamps, (2) a second common line commonly connected to a second electrode terminal of each of even-numbered lamps of the plurality of lamps, and (3) a ground voltage line connecting each of the first common line and the second common line to a ground

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voltage source (as a result of providing phase difference to lamps; see Figs. 4A-C of Tajika et al.).

With respect to claim 5, AAPA (Fig. 3) shows that each inverter comprises (1) a transformer [22] that converts a voltage from a voltage source [Vin] into the lamp driving current and supplies the lamp driving current to a first electrode terminal of each of the plurality of lamps, (2) a switching circuit [24] that switches the voltage into the transformer, and (3) a controller [26] controlling the switch circuit [24] with reference to a feedback signal [FB] from the current detector [30].

With respect to claim 6, the combination of AAPA (Figs. 1-4) and Tajika et al. (Figs. 1, 3, and 4A-C) disclose that a primary winding and a secondary winding of the transformer connected to each of odd-numbered lamps of the plurality of lamps are wound in the same direction, and the primary winding and the secondary winding of the transformer connected to each of even-numbered lamps of the plurality of lamps are wound in a direction of the transformers connected to the odd-numbered lamps.

With respect to claim 7, the combination of AAPA (Figs. 1-4) and Tajika et al. (Figs. 1, 3, and 4A-C) disclose that the current detector is connected to a secondary winding of the transformer (via lamp [40]; see Fig. 3 of AAPA).

With respect to claim 10, AAPA Figs. 1-4 show a lamp driving apparatus of a liquid crystal display comprising a plurality of lamps including a plurality of odd-numbered lamps and a plurality of even-numbered lamps, and an inverter block [20] having a plurality of inverters that supply a drive current to all the lamps. However, AAPA Figs. 1-4 do not show that inverters

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that supply a drive current to the even-numbered lamps have a first phase and inverters that supply a drive current to the odd-numbered lamps have a phase opposite the first phase.

Tajika et al. discloses, in Figs. 1, 3, and 4A-C, a lamp driving apparatus of a liquid crystal display comprising a plurality of inverters [..., 2a, 2b, ...] and a plurality of lamps [..., 3a, 3b, ...] in which inverters that supply a drive current to even-numbered lamps have a first phase and inverters that supply a drive current to odd-numbered lamps have a phase opposite the first phase (see Figs. 4A-C; Abstract, lines 6-7; col. 4, lines 21-25).

It would have been obvious to one of ordinary skill in the art at the time of the invention to implement the lamp driving apparatus of AAPA Figs. 1-4 by providing inverters that supply a drive current to even-numbered lamps a first phase and inverters that supply a drive current to odd-numbered lamps a phase opposite the first phase as taught by Tajika et al. to enhance the display monitor brightness since Tajika et al. teaches that the dynamic range of the display monitor brightness can not be sufficiently wide with lamps operated in the same phase (see col. 1, lines 32-37).

With respect to claim 11, AAPA Figs. 1-4 show that the lamp driving apparatus further comprises a current detector that detects the lamp drive current supplied to each of the plurality of lamps from the inverter.

With respect to claim 12, the combination of AAPA Figs. 1-4 and Tajika et al. (Figs. 1, 3, and 4A-C) disclose all of the claimed subject matter, as expressly recited in claims 1 and 2, except that the inverter block and the current detector are mounted in the same integrated circuit substrate and that the integrated substrate is folded to a rear surface of the liquid crystal display. However, this difference is not of patentable merit since it cannot be seen that such configuration

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may affect the functional operation of the driving apparatus. Therefore, accommodating the apparatus of the combination of AAPA Figs. 1-4 and Tajika et al. in such a way in that the inverter block and the current detector are arranged in the same integrated circuit substrate and the integrated circuit substrate is folded to a rear surface of the liquid crystal display would have been deemed as an obvious development to a person skilled in the art.

With respect to claim 13, the combination of AAPA (Figs. 1-4) and Tajika et al. (Figs. 1, 3, and 4A-C) appear to disclose that the lamp driving apparatus further comprises (1) a first common line commonly connected to a second electrode terminal of each of the odd-numbered lamps of the plurality of lamps, (2) a second common line commonly connected to a second electrode terminal of each of the even-numbered lamps of the plurality of lamps, and (3) a ground voltage line connecting each of the first common line and the second common line to a ground voltage source (as a result of providing phase difference to lamps; see Figs. 4A-C of Tajika et al.).

With respect to claim 14, AAPA (Fig. 3) shows that each of the inverters comprises (1) a transformer [22] that converts a voltage from a voltage source [Vin] into the lamp driving current and supplies the lamp driving current to a first electrode terminal of each of the plurality of lamps, (2) a switching circuit [24] that switches the voltage into the transformer, and (3) a controller [26] controlling the switch circuit [24] with reference to a feedback signal [FB] from the current detector [30].

With respect to claim 15, the combination of AAPA (Figs. 1-4) and Tajika et al. (Figs. 1, 3, and 4A-C) disclose that a primary winding and a secondary winding of the transformer connected to each of odd-numbered lamps of the plurality of lamps are wound in the same

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direction, and the primary winding and the secondary winding of the transformer connected to each of even-numbered lamps of the plurality of lamps are wound in a direction of the transformers connected to the odd-numbered lamps.

With respect to claim 16, the combination of AAPA (Figs. 1-4) and Tajika et al. (Figs. 1, 3, and 4A-C) disclose that the current detector is connected to a secondary winding of the transformer (via lamp [40]; see Fig. 3 of AAPA).

10. Claims 8-9 and 17-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicants' Admitted Prior Art (AAPA) Figs. 1-4 in view of Tajika et al. (U.S. Patent No. 6,469,453) as applied to claims 1-2, 5, 10-11, and 14 above, and further in view of Liu (U.S. Patent No. 5,619,402).

With respect to claims 8-9 and 17-18, the combination of AAPA (Fig. 3) and Tajika et al. disclose all of the claimed subject matter, as expressly recited in claims 1-2, 5, 10-11, and 14, wherein the current detector comprises a resistor [R1] connected between a secondary winding of the transformer and a ground voltage source (pathway through lamp; see Fig. 3 of AAPA), a first diode [D1] connected between a control block [21] and a first node [N1] between the secondary winding of the transformer and the resistor, and a variable resistor connected between the ground voltage source and a node between the first diode and the control block, except for an inclusion of a capacitor connected in parallel to the variable resistor.

Liu discloses, in Fig. 3, a power supply to cold cathode fluorescent lamps comprising a capacitor [276] connected in parallel with a variable resistor [274].

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It would have been obvious to one of ordinary skill in the art at the time of the invention to implement the current detector of the combination of AAPA (Fig. 3) and Tajika et al. by additionally configuring a capacitor in parallel with the variable resistor so as to form an RC network for filtering and rounding off the edge of the waveform at the first node since such an arrangement of the capacitor for the stated purpose has been well known in the art as evidenced by the teachings of Liu (see Fig. 3; col. 6, lines 51-54).

Citation of relevant prior art

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Prior art Yoo et al. (Pub. No.: US 2003/0214478 A1) discloses a backlight assembly.

Prior art Lee et al. (Pub. No.: US 2003/0142060 A1) discloses a backlight assembly in an LCD.

Prior art Cho et al. (U.S. Patent No. 6,674,250) discloses a backlight assembly.

Prior art Shin (U.S. Patent No. 6,661,181) discloses a backlight assembly.

Prior art Van Duijneveldt (U.S. Patent No. 5,971,567) discloses a backlight assembly.

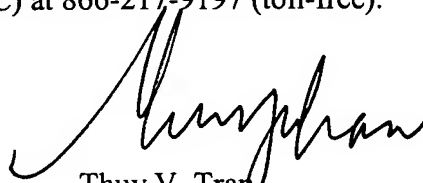
Inquiry

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thuy V. Tran whose telephone number is (571) 272-1828. The examiner can normally be reached on M-F (8:00 AM -5:00 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Don Wong can be reached on (571) 272-1834. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read 'Thuy V. Tran', is written over the printed name.

Thuy V. Tran
Primary Examiner
Art Unit 2821

01/07/2005